Naturalization of *Brugmansia suaveolens* (Humb. & Bonpl. ex Willd.) Bercht. & J.Presl and *Gaillardia pulchella* Fougereux in Tripura, India

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Abstract

The occurrence of two exotic angiospermic species *Brugmansia suaveolens* (Humb. & Bonpl. ex Willd.) Bercht. & J.Presl and *Gaillardia pulchella* Fougereux in Tripura in naturalization condition in the state of Tripura in North-east India.

Key words: *Brugmansia suaveolens* and *Gaillardia pulchella*, Naturalization, Tripura.

INTRODUCTION

The flora of any region is always changing due to inward and outward migration of different species. At the same time forced introduction of many species by man as crop or ornamental or any type of useful plants is also a continuous process. Many weedy plants also reach to other localities through natural migration or accidentally by human (Das 2002, 2011; McDougall *et al.* 2011).

Tripura, the second smallest state of North-eastern India is surrounded by Bangladesh in three sides and situated between 22°56' N to 24°32' N latitudes and between 91°09' E to 92°20' E longitudes (Kar & Datta 2015). It is positioned at the convergence of Indo-Burman biogeographical zone (Rao 1994) and part of the IUCN recognized Indo-Burma Biodiversity Hotspot (Myers *et al.* 2000; Mittermeier *et al.* 2005). The undulating topography, high rainfall and varied altitudes are main factors that have contributed to its rich hilly ecosystem and habitat diversity (Kar *et al.* 2019).

Deb (1981, 1983) studied the flora of Tripura state with later additions. During continuous field survey (2018 – 2019), recently two plants were collected from different parts of the state in naturalized condition and were identified as *Brugmansia suaveolens* (Humb. & Bonpl. ex Willd.) Bercht. & J.Presl and *Gaillardia pulchella* Fougereux.

Brugmansia suaveolens (Solanaceae) is a native of South-Eastern Brazil and is referred as Brazil's white angel trumpet, angel's tears and snowy angel's trumpet. The species was thought to be extinct in the wild. Like several other species of *Brugmansia*, it exists in areas outside its native range. It is a tender shrub or small tree with large semi-evergreen leaves and fragrant yellow, pink or white trumpet-shaped large corolla. The geographical locations of the species from where it was collected from Jampui (N 24°00'22.79" and E 92°16'48.85") and of Kamalghat (Fatikcherra) (N 23°59'34.07" and E 92°16'29.00" and also at N 23°49'46.05" and E 91°22'33.88" E) of Tripura, India.

On the other hand, *Gaillardia pulchella* (Asteraceae) grow best in open, well-drained soils and full direct sunlight, is native to Central & S. U.S.A. to N. Mexico (POWO 2020). They are

favourites as cut flowers and propagated by seeds (Bailey 1976). Blanket flower (*Gaillardia* sp.) or firewheel or Indian blanket is extensively cultivated in many areas for flower production. It is one of the hardiest annual can be grown in a wide range of tropical to temperate climate. This is substitute flower crop for *Chrysanthemum* spp. and China-aster (Bose *et al.* 2003). There are about 28 accepted species and none of them is native to Indian subcontinent. However, here in Tripura, the was found in naturalized state in the Suryamaninagar (N 23°45'50.4" and E 91°15'38.2").

So, the present paper reports the naturalization of two exotic species in the North-east Indian state of Tripura along with their description and photographs. The voucher specimens has been deposited in the Tripura University Herbarium.

TAXONOMIC TREATMENT

Brugmansia suaveolens (Humb. & Bonpl. ex Willd.) Bercht. & J.Presl, Pri. Rostlin. 1(Solanac.): 45. 1823; Zhang *et al.*, Fl. China 17: 300. 1996. [Solanaceae] [Figures 1 & 2]

Vernacular name: Angel's Trumpet.

Erect, much-branched shrubs, 150 – 250 cm tall, stem soft-wooded. Stems solid, terete, green when young, grayish on maturity. Leaves simple, alternate; Lamina lanceolate, 17.4 – 22.7 × 7.1 – 10.4 cm, entire, acute, base attenuate, veins reticulate with prominent mid-vein, herbaceous, sticky-hairy; petioles 3 – 4 cm long, terete, hairy. Flowers commonly solitary and axillary, pendulous, hypogynous; pedicel 2 – 2.5 cm long; calyx 10 – 10.5 cm long, 5-lobed, united up to the middle, lobes subulate, acute, green, deciduous; corolla trumpet-shaped (campanulate), 25 – 30 cm long, 5-lobed, contortate-folded, generally white, pale pink of yellow in some

Figure 1. *Brugmansia suaveolens* (pink-flowered): **A.** Whole plant; **B to D.** Flower, calyx, corolla, androecium, gynoecium; **F to H.** Stigma

cultivars; stamens 5, epipetalous, anthers basifixed, bilocular, 2.5 – 3 cm long. Carpels 2; ovary rounded-oblong, conical above, glabrous, placentation- axile; style simple, 20 – 22 cm long; stigma oblong with rounded tip. Fruits terete-oblong, conical upwards, smooth, green; seeds numerous.

Habitat: In its introduced range, *Brugmansia suaveolens* occupies lowland rainforest, forest edges, disturbed habitats, riverbanks and urban open spaces.

Flowering: October – February in Tripura.

Specimen cited: Tripura, Tripura University, Bhattacharya *et al.*, TUH-3901, Dated 09.10.2019.

Distribution: Native of Brazil but introduced widely in subtropical to temperate areas of the world and has naturalized in many areas.

Indian distribution: Maharashtra, Karnataka, Andhra Pradesh, West Bengal, Assam, Tripura.

State distribution: Throughout the state of Tripura; naturalized.

Use: *Brugmansia suaveolens* is a popular garden plant. It is grown for its pendulous large-showy and attractive blooms. It can be smoked, eaten, drunk as a tea, or taken as an enema. In Tanzania it is added to beer. Traditional healers use its dried leaves with tobacco to induce diagnostic visions for treating various diseases. It is occasionally used as a live hedge in Uganda. Extracts of flowers have shown pain-killing (antinociceptive) activity in mice. There is a wide range of medicinal and spiritual uses, many shared with other species and hybrids, among the indigenous people who cultivate it (Hay *et al.* 2012).

Figure 2. *Brugmansia suaveolens* (White-flowered): **I.** Whole plant; **J** to **L.** Flower, calyx, corolla, androecium, gynoecium; **M** to **N.** Stigma

Figure 3. *Gaillardia pulchella*: **A – C.** Whole plant; **D.** A flowering twig; **E** splitted ray floret; **F.** splitted disc-floret

Gaillardia pulchella Fougereux, Hist. Acad. Roy. Sci. Mém. Math. Phys. (Paris, 4to). 1786: 5, fig. 1. 1788. [Asteraceae] [Figure 3]

Vernacular name: Blanket flower, Firewheel, Girasol Rojo.

Annual herb, lower branches prostrate, spreading, flowering branches erect, spreading over 20 – 60 cm. Stems rigid-herbaceous, profusely branched, solid, terete, hairy, green. Leaves simple, alternate, cauline, sessile to subsessile, exstipulate; lamina linear, oblong, 5 – 10 cm × 4 – 12 mm, herbaceous. Capitulum with ray and disc florets; pappus reduced to scales; ray florets usually 20 – 28; corolla ligulate, 4-lobed, usually reddish to purplish proximally, yellow to orange distally, 12 – 20 mm long; disk-florets numerous; corolla tubular, 5-lobed; yellowish to brown, often bicoloured; throat campanulate, 6 - 9 mm; lobes deltate, often attenuate hairy; stamens 5, epipetalous, filaments white, glabrous, 1.5 – 2.5 mm long; anthers bilobed, syngenesious, purplish yellow, basifixed. Carpels 2, inferior, 1- chambered with one ascending anatropous ovule on basal placentation; style simple, 1.3 – 2.2 mm; stigma feathery or bifid.

Habitat: Sunny and sandy, fast-draining and soils. They rarely survive the winter in heavier soil.

Flowering: May to August.

Specimens cited: Tripura, Tripura University campus, Bhattacharya *et al.*, TUH-3912, dated 09.10.2019.

Distribution: Native to Eastern and south-central United States, Mexico, Florida, Arizona. Widely introduced as ornamental herb to tropical to subtropical areas.

Indian distribution: Maharashtra, Karnataka, Andhra Pradesh, West Bengal, Tamil Nadu, Jammu and Kashmir, Sikkim, Rajasthan, Uttar Pradesh, Delhi, Haryana and Kerala.

State distribution: Suryamaninagar, West Tripura; naturalized.

Use: Mass plantings for beds and borders, rock gardens, naturalize in meadows, cottage gardens or native wildflower gardens (www.missouribotanicalgarden.org). Tea of root for gastroenteritis, chewed powdered root applied to skin disorders and for sore eyes (wildflower.org/plants, 2020).

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